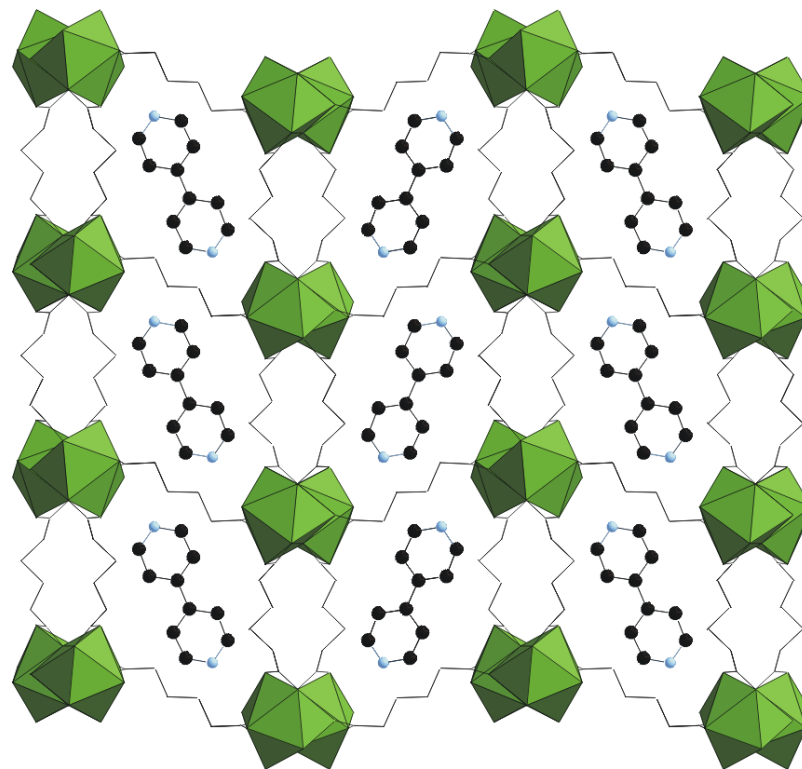


Design of Organic-Inorganic Hybrid Lanthanide and Actinide Materials

Christopher L. Cahill, The George Washington University

DMR-0348982

We have developed a new route to metal-organic framework (or MOF) materials through the use of uncoordinated guest, or 'template' molecules to influence topology. Such materials have potential applications in gas storage, sensing and catalysis. Typical hydrothermal reaction mixtures that produce MOFs include a metal center and a multifunctional organic linker molecule by which assembly into an extended architecture is achieved. We extend this approach by including a second organic species that will not coordinate to the metal center based on hard-soft acid-base considerations. Specifically, GWMOF-6 (at right) is formed from coordination of Ln^{3+} metal centers ($\text{Ln} = \text{Pr}, \text{Eu}$) through difunctional adipic acid molecules. Introduction of 4,4'-diiridyl influences the overall topology of the framework without actually coordinating to the host itself, save for hydrogen bonding. Further, this unsaturated guest molecule can be shown to enhance luminescence of the Ln host through indirect excitation (the antenna effect.).



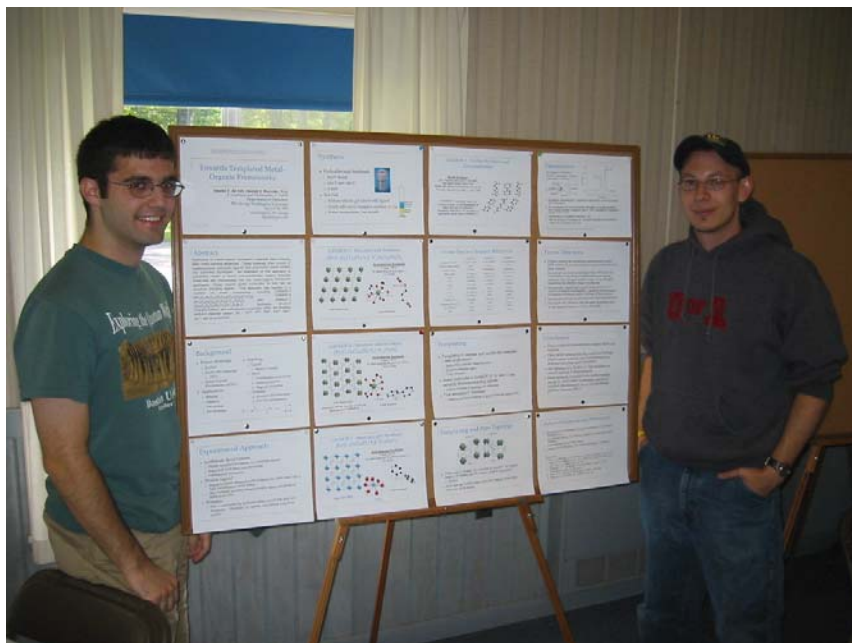
GWMOF-6: chains of PrO_9 polyhedra (green) run into the page and are cross-linked by adipic acid groups (black lines). 4,4'-dipyridyl molecules (ball and stick) reside in the channels of this framework material.

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Education



Undergraduate Dan Bozutto (left) presenting a poster at the GWU Chemistry Department's Annual Retreat. **Graduate** student Dan DeLill (R) received and ACS Division of Inorganic Chemistry Travel Award to present a poster at the Fall 2004 Meeting.

Research Group, Fall 2004

Graduate Students: Lauren Borkowski,* Daniel DeLill, Mark Frisch, Noel Gunning, Shannon Morrison.

Undergraduates: Jacquelyn Danek,† Daniel Bozutto
(two females, one African American).

* Received full scholarship to attend DOE's National School on X-ray and Neutron Scattering

† Participated in NSF-REU program at Cornell University's Center for Materials Research.

